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Xinye Liu

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SONNENSCHN NATH & ROSENTHAL LLP

P.O. BOX 061080

WACKER DRIVE STATION, SEARS TOWER

CHICAGO, IL 60606-1080

EXAMINER

ZERVIGON, RUDY

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/791,030	Applicant(s) LIU ET AL.	
	Examiner Rudy Zervigon	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 56-70 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 56-70 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “second pressure source” must be shown or the feature canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to because 403 in the specification page 21 should be element 402 as supported by the figures. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior

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version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o), § 1302.01. Correction of the following is required: See above drawing objections.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 56, 57, and 59-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton; Todd A. (US 5993555 A) in view of Sakai; Hiroyuki et al. (US 5070813 A). Hamilton teaches a reaction chamber (112; Figure 4) including a first flow pathway (along 136+128; Figure 4) and first flow limiting conductance (136), second flow pathway (along 132+128; Figure 4) and second flow limiting conductance (132), third flow pathway (along 142+122;

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Figure 4) and third flow limiting conductance (142), fourth flow pathway (along 144+124; Figure 4) and fourth flow limiting conductance (144). Further, claims 56, 57, 59-70 have numerous intended use recitations bracketting Applicant's structural elements generally directed to relative line pressures, relative flow rates, relative "switching"/"selecting" configurations, and "expose period". All of such claim limitations are deemed intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is configured of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Hamilton further teaches wherein the gas flow pathway comprises multiple gas flow pathways for purge gasses and chemical precursors which share one or more common inputs to the reactor chamber (112; Figure 4), as claimed by claim 69

Hamilton does not teach:

- i. a second gas flow pathway coupled downstream of the reaction chamber and having switchable second and fourth limiting conductances – claim 56
- ii. An atomic layer deposition (ALD) system, comprising: a gas flow pathway coupled upstream of Hamilton's reactor chamber (112; Figure 4) through selectable Hamilton's upstream flow limiting conductances (132,134,136,142,144; Figure 4) having two or more operational modes including a low flow mode and a high flow mode; and a

pumping arrangement coupled downstream of the reactor chamber (112; Figure 4) through selectable downstream flow limiting conductances having two or more operational modes including a low flow mode and a high flow mode, wherein the Hamilton's upstream flow limiting conductances (132,134,136,142,144; Figure 4) and downstream flow limiting conductances are configured to switch operational modes in time-phase with one another, as claimed by claim 62. Applicant's claim limitations of "An atomic layer deposition (ALD) system:", "having two or more operational modes including a low flow mode and a high flow mode", and "configured to switch operational modes in time-phase with one another" are each claim requirements of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- iii. The ALD apparatus of claim 62, wherein the Hamilton's upstream flow limiting conductances (132,134,136,142,144; Figure 4) are configured to switch operational modes prior to the downstream flow limiting conductances switching operational modes, as claimed by claim 63

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- iv. The ALD apparatus of claim 62, wherein the downstream flow limiting conductances include a throttle valve, as claimed by claim 64
- v. The ALD apparatus of claim 64, wherein the throttle valve comprises an annular throttle valve located within the reactor chamber (112; Figure 4), as claimed by claim 65.
- vi. The ALD apparatus of claim 65, wherein the annular throttle valve includes multiple vanes, each having an axis therethrough, as claimed by claim 66
- vii. The ALD apparatus of claim 65, wherein the annular throttle valve includes multiple blades arranged in an iris configuration, as claimed by claim 67
- viii. The ALD apparatus of claim 65, wherein the annular throttle valve includes multiple blades, each having a number of holes therethrough, at least one of the blades being rotatable about an axis such that holes extending through the rotatable blade align with holes of at least one of the other blades to provide a passage through the annular throttle valve, as claimed by claim 68
- ix. The ALD apparatus of claim 62, wherein the Hamilton's upstream flow limiting conductances (132,134,136,142,144; Figure 4) and downstream flow limiting conductances are configured to switch operations modes according to a difference in residence times for passage of gas between (i) the upstream conductances and the reaction chamber, and (ii) the reaction chamber and the downstream conductances, as claimed by claim 70

Sakai teaches a wafer treating apparatus (Figure 1) including reaction chamber (1; Figure 1).

Sakai further teaches:

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- i. a pumping (8; Figure 1, column 2; lines 45-69) arrangement coupled downstream of the reactor chamber (1; Figure 1, column 2; lines 45-69) through selectable downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) having two or more operational modes including a low flow mode and a high flow mode, wherein the Sakai's upstream flow limiting conductances (132,134,136,142,144; Figure 4) - claim 62. Applicant's claim limitations of "An atomic layer deposition (ALD) system:", "having two or more operational modes including a low flow mode and a high flow mode", and "configured to switch operational modes in time-phase with one another" are each claim requirements of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- ii. switch operational modes prior to the downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) switching operational modes, as claimed by claim 63. Applicant's claim limitations of "are configured to switch operational modes prior" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205

USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- iii. the downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) include a throttle valve (9; Figure 1, column 2; lines 45-69,2), as claimed by claim 64
- iv. the throttle valve (9; Figure 1, column 2; lines 45-69,2) comprises an annular throttle valve (9; Figure 1, column 2; lines 45-69,2) located within the reactor chamber (1; Figure 1, column 2; lines 45-69), as claimed by claim 65.
- v. the annular throttle valve (9; Figure 1, column 2; lines 45-69,2) includes multiple vanes (10; Figure 2; column 3; lines 1-29), each having an axis therethrough, as claimed by claim 66
- vi. the annular throttle valve (9; Figure 1, column 2; lines 45-69,2) includes multiple blades (10; Figure 2; column 3; lines 1-29) arranged in an iris configuration, as claimed by claim 67
- vii. the annular throttle valve (9; Figure 1, column 2; lines 45-69,2) includes multiple blades (10; Figure 2; column 3; lines 1-29), each having a number of holes (a,b; Figure 2; column 3; lines 1-29) therethrough, at least one of the blades (10; Figure 2; column 3; lines 1-29) being rotatable about an axis such that holes (a,b; Figure 2; column 3; lines 1-29) extending through the rotatable blade align with holes (a,b; Figure 2; column 3; lines 1-29) of at least one of the other blades (10; Figure 2; column 3; lines 1-29) to provide a

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passage through the annular throttle valve (9; Figure 1, column 2; lines 45-69,2), as claimed by claim 68

- viii. Sakai's downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) is configured to switch operations modes according to a difference in residence times for passage of gas between (i) the upstream conductances and the reaction chamber, and (ii) the reaction chamber and the downstream conductances, as claimed by claim 70. Applicant's claim limitation "configured to switch operations modes according to a difference in residence times for passage of gas between (i) the upstream conductances and the reaction chamber, and (ii) the reaction chamber and the downstream conductances" is a claim limitation of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Sakai's downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) and pumping arrangement (8; Figure 1, column 2; lines 45-69) to Hamilton's apparatus.

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Motivation to add Sakai's downstream flow limiting conductances (9-11, 13-20; Figure 1, column 2; lines 45-69) and pumping arrangement (8; Figure 1, column 2; lines 45-69) to Hamilton's apparatus is for accurate exhaust flow control as taught by Sakai (column 1, lines 53-64).

6. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton; Todd A. (US 5993555 A) and Sakai; Hiroyuki et al. (US 5070813 A) and further in view of Cox; Gerald M. (US 6228773 B1). Hamilton and Sakai are discussed above. Hamilton and Sakai do not teach a plasma assisted process. Cox teaches a similar processing apparatus arrangement in Figure 14, including external plasma sources 4.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Cox's plasma source to Hamilton's apparatus.

Motivation to add Cox's plasma source to Hamilton's apparatus is for providing "plasma treatment" to wafers as taught by Cox (claim 25).

Response to Arguments

7. Applicant's arguments filed February 1, 2008 have been fully considered but they are not persuasive.

8. Applicant's arguments based on the Examiner's drawing objections of not detailing the claimed "second pressure source" is not convincing. In the art, the Examiner believes that such a term may be confused with a tank of gas or other equivalent source or pressure. For this reason, the Examiner maintains his drawing objections.

9. Applicant's argument that the Examiner is applying the statements of intended use to overcome the purported "deficiency" of the Examiner's art-based motivation for the proposed

combination is misguided. The Examiner's application of his intended use statements are extremely specific to only portions of claimed features which are believed to be intended use. A review of the Examiner's rejections above recites specific claimed features, in quotes, that are believed to be intended use in the pending apparatus claims.

10. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "the programming") are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-

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1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792